REMARKS

Claims 1 and 9-11 stand rejected under 35 USC § 102(b) as being anticipated by Anderson, U.S. Patent No. 6,009,677. Claims 4 and 7-8 stand rejected under 37 USC § 103(a) as being unpatentable over Anderson in view of Reynolds, U.S. Patent No. 2,971,295. Claims 2, 3, 5, 6 and 12-13 stand objected to as being dependent upon a rejected base claim, but have been indicated as being allowable if amended to include the limitations of the base claim and any intervening claim. Claims 1-13 remain at issue.

Claim 1 is directed to a rectangular concrete tank having a concrete slab with a metal slab steel plate anchored thereto. The metal slab steel plate defines a substantially linear concrete side wall location of a rectangular tank outline. A plurality of preformed concrete side panels each have metal plates attached along the bottom edge and along opposing side edges. The bottom plates are welded in a liquid-tight weld to the slab metal plate and at least one side metal plate of each side panel is welded to a side metal plate of an adjacent side panel in a liquid-tight weld to define a rectangular tank side wall.

The rectangular concrete tank of the present invention provides a tank for containing liquids which is both rectangular and liquid-tight. The liquid-tight nature of the rectangular tank stems from the use of liquid-tight welded joints. Liquid-tight welds are distinct from other types of welds because they are intended to prevent leakage of liquids therethrough. Liquid-tight welds are a type of "seal weld" as defined in the attached *Standard Welding Terms and Definitions*, American Welding Society, July 2001, page 33, Exhibit A. Seal welds are recognized as a distinct weld providing tightness against "leakage". In the rectangular tank of the present invention, seal welds are used to provide tightness against leakage of *liquids* and hence are termed "liquid-tight" welds.

It should be emphasized that the current invention teaches welding of the joints to provide a barrier against the leakage of liquids as opposed to Anderson in which the welding of joints is used for structural connections between the various concrete members. The rectangular concrete tank relies on post-tensioning tendons for structural support of the tank and does not rely on the welding of joints for structural purposes. Structural welds do not of necessity provide a sealing or liquid-tightness function. One skilled in the art of welding would understand that structural welds are not necessarily continuous, but may be intermittent, and/or may be allowed a certain degree of porosity or inclusions by accepted standards which could

make them unsuitable for use as a liquid-tight seal weld. (See definitions of continuous, intermittent, inclusions, and porosity in the attached *Standard Welding Terms and Definitions*, American Welding Society, July 2001, pages 9, 21, and 29, Exhibit A). Anderson is directed to a multi-story concrete/steel frame building construction and does not teach or suggest the desirability of using exclusively liquid-tight welds for all horizontal and vertical welds. In discussing a particular joint, horizontal welds between stacked walls, Anderson does note that "These welds can be made continuous for locations where a complete seal is required to the exterior. On the other hand, such welds can be made intermittent where load transfer allows some reduction in the weld length." *(Anderson, column 9, lines 31-35)* In the complete context of Anderson, it is clear that Anderson is not suggesting that seal welds (and particularly liquid-tight seal welds) are an integral part of his building structure or are necessary or desired for all welds. Indeed, one skilled in the art would understand that Anderson does not teach the exclusive use of liquid-tight welds because there is no need to incur the time and expense associated with providing liquid-tight welds in all of the welds in the conventional building structure of Anderson. On the other hand liquid-tight seal welding of all joints is essential to the current invention and the various vertical and horizontal joints have been carefully configured and aligned to provide a continuous seal against leakage.

While the Examiner states at page 1 of the Office Action that "The bottom edges *(sic)* plates [of Anderson] being liquid welded," the specification itself does not appear to use the term "liquid welded." In addition, the term "liquid welded" is not a term which is generally recognized in the welding arts. See *Standard Welding Terms and Definitions*, page 23; Exhibit A (no definition of "Liquid Weld" provided).

Reynolds is directed to prestressed concrete units and structures and, like Anderson, fails to teach the desirability of using liquid-tight or seal welds in order to provide a tank suitable for retaining liquids.

Because Anderson fails to teach the exclusive use of liquid-tight welds in a tank structure, Applicant respectfully submits Anderson does not anticipate claims 1 and 9-11. Because neither Anderson alone or in combination with Reynolds teaches liquid-tight welds, application further respectfully submits that claims 4 and 7-8 are not obvious over Anderson in view of Reynolds. Accordingly, reconsideration and withdrawal of the rejection of the claims as well as prompt issuance of a notice of allowance are respectfully requested. If it would be

helpful to obtain favorable consideration of this case, the Examiner is encouraged to call and discuss this case with the undersigned.

This constitutes a request for any needed extension of time and an authorization to charge all fees therefore to deposit account No. 19-5117 if not otherwise specifically requested. The undersigned hereby authorizes the charge of any required fees not included or any deficiency of fees submitted herewith to be charged to deposit account No. 19-5117.

Respectfully submitted,

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EXHIBIT A

**Key Words**—Standard welding terminology, welding definitions, brazing, soldering, thermal spraying, thermal cutting

**AWS A3.0:2001**
**An American National Standard**

**Approved by**
**American National Standards Institute**
**July 2, 2001**

# Standard Welding Terms and Definitions

## Including Terms for Adhesive Bonding, Brazing, Soldering, Thermal Cutting, and Thermal Spraying

**Supersedes ANSI/AWS A3.0-94**



Prepared by
AWS A2 Committee on Definitions and Symbols

Under the Direction of
AWS Technical Activities Committee

Approved by
AWS Board of Directors



## Abstract

This standard is a glossary of the technical terms used in the welding industry. Its purpose is to establish standard terms to aid in the communication of welding information. Since it is intended be a comprehensive compilation of welding terminology, nonstandard terms used in the welding industry are also included. All terms are either standard or nonstandard. They are arranged in the conventional dictionary letter-by-letter alphabetical sequence.



**American Welding Society**
550 N.W. LeJeune Road, Miami, Florida 33126

**continuous wave laser.** A laser having an output that operates in a continuous rather than a pulsed mode. A laser operating with a continuous output for a period greater than 25 milliseconds is regarded as a continuous wave laser.

**continuous weld.** A weld that extends continuously from one end of a joint to the other. Where the joint is essentially circular, it extends completely around the joint.

**convex fillet weld.** A fillet weld having a convex weld face. See Figure 25(A).

**convexity.** The maximum distance from the face of a convex fillet weld perpendicular to a line joining the weld toes. See Figure 25(A).

**convex root surface.** The configuration of a groove weld exhibiting root reinforcement at the root surface. See Figure 27(E).

**cool time,** *resistance welding.* The time interval between successive heat times in multiple-impulse welding or in the making of seam welds. See Figures 48(B) and 49.

**copper brazing.** A nonstandard term when used for **brazing** with a copper filler metal.

**cord,** *thermal spraying.* Surfacing material in the form of a plastic tube filled with powder that has been extruded to a compact, flexible cord with characteristics similar to a wire.

**cored solder.** A solder wire or bar containing flux as a core.

**corner-flange weld.** A nonstandard term when used for an **edge weld** in a **flanged corner joint.**

**corner joint.** A joint between two members located approximately at right angles to each other in the form of an L. See Figures 1(B) and 2(B).

**corona,** *resistance welding.* The area sometimes surrounding the nugget of a spot weld at the faying surfaces which provides a degree of solid-state welding.

**corrective lens.** A lens ground to the wearer's individual corrective prescription.

**corrosive flux.** A flux with a residue that chemically attacks the base metal. It may be composed of inorganic salts and acids, organic salts and acids, or activated rosin.

**cosmetic weld bead.** A weld bead used to enhance appearance.

**cosmetic weld pass.** A weld pass resulting in a cosmetic weld bead.

**$CO_2$ welding.** A nonstandard term when used for **flux cored arc welding** or **gas metal arc welding** with carbon dioxide shielding gas.

**covalent bond.** A primary bond arising from the reduction in energy associated with overlapping half-filled orbitals of two atoms.

**cover bead.** A weld bead resulting from a cover pass.

**covered electrode.** A composite filler metal electrode consisting of a core of a bare electrode or metal cored electrode to which a covering sufficient to provide a slag layer on the weld metal has been applied. The covering may contain materials providing such functions as shielding from the atmosphere, deoxidation, and arc stabilization, and can serve as a source of metallic additions to the weld. See also **lightly covered electrode.**

cover lens. A nonstandard term for a **cover plate.**

**cover pass.** A weld pass or passes resulting in the exposed layer of a multipass weld on the side from which welding was done.

**cover plate.** A removable pane of colorless glass, plastic-coated glass, or plastic that covers the filter plate and protects it from weld spatter, pitting, or scratching.

**crack.** A fracture type discontinuity characterized by a sharp tip and high ratio of length and width to opening displacement. See Figure 33.

**crater.** A depression in the weld face at the termination of a weld bead.

**crater crack.** See Figure 33.

**crater fill current.** The current value during crater fill time. See Figure 53.

**crater fill time.** The time interval following weld time but prior to meltback time during which arc voltage or current reach a preset value greater or less than welding values. Weld travel may or may not stop at this point. See Figure 53.

**crater fill voltage.** The arc voltage value during crater fill time. See Figure 53.

**cross-sectional sequence.** The order in which the weld passes of a multiple-pass weld are made with respect to the cross section of the weld. See Figures 23(B)–(E). See also **block sequence, cascade sequence,** and **continuous sequence.**

**cross wire welding.** A common variation of projection welding wherein the localization of the welding current is achieved by the intersection contact of wires,

**inclined position.** A nonstandard term when used for the **multiple welding position** and **6G**.

**inclined position with restriction ring.** A nonstandard term when used for the **multiple welding position** and **6GR**.

**included angle.** A nonstandard term when used for **groove angle**.

**inclusion.** Entrapped foreign solid material, such as slag, flux, tungsten, or oxide.

**incomplete fusion (IF).** A weld discontinuity in which fusion did not occur between weld metal and fusion faces or adjoining weld beads. See Figure 29. See also **complete fusion**.

**incomplete joint penetration (IJP).** A joint root condition in a groove weld in which weld metal does not extend through the joint thickness. See Figure 26. See also **complete joint penetration, complete joint penetration weld, joint penetration,** and **partial joint penetration weld**.

**indentation,** *projection welding, resistance seam welding and resistance spot welding.* The depression on the exterior surface of the workpieces.

**indirect welding.** A resistance welding secondary circuit variation in which the welding current flows through the workpieces in locations away from, as well as at, the welds for resistance spot, seam, or projection welding. See Figures 47(D)–(G).

**induction brazing (IB).** A brazing process that uses heat from the resistance of the workpieces to induced electric current.

**induction seam welding (RSEW-I).** A resistance seam welding process variation in which high-frequency welding current is induced in the workpieces. See also **high-frequency resistance welding** and **high-frequency seam welding**.

**induction soldering (IS).** A soldering process in which the heat required is obtained from the resistance of the workpieces to induced electric current.

**induction upset welding (UW-I).** An upset welding process variation in which high-frequency welding current is induced in the workpieces. See Figure 51(E). See also **high-frequency resistance welding** and **high-frequency upset welding**.

**induction welding (IW).** A welding process that produces coalescence of metals by the heat obtained from the resistance of the workpieces to the flow of induced high-frequency welding current with or without the application of pressure. The effect of the high-frequency welding current is to concentrate the welding heat at the desired location. See Figure 51(E).

**induction work coil.** The inductor used when welding, brazing, or soldering with induction heating equipment. See Figure 51(E).

**inert gas.** A gas that normally does not combine chemically with materials. See also **protective atmosphere**.

**inert gas metal arc welding.** A nonstandard term for **gas metal arc welding**.

**inert gas tungsten arc welding.** A nonstandard term for **gas tungsten arc welding**.

**inertia friction welding (FRW-I).** A variation of friction welding in which the energy required to make the weld is supplied primarily by the stored rotational kinetic energy of the welding machine. See Figure 44. See also **direct drive friction welding**.

**infrared brazing (IRB).** A brazing process that uses heat from infrared radiation.

**infrared radiation.** Electromagnetic energy with wave lengths from 770 to 12,000 nanometers.

**infrared soldering (IRS).** A soldering process in which the heat required is furnished by infrared radiation.

**initial current.** The current after starting, but before establishment of welding current. See Figure 52.

**insulating nozzle,** *self-shielded flux cored arc welding.* A device at the exit end of the welding gun that protects the contact tip from spatter and may increase the electrode extension while maintaining a shorter stick-out. See Figure 38(B).

**interface.** See **braze interface, solder interface, thermal spray deposit interface,** and **weld interface**.

**intergranular penetration.** The penetration of a filler metal along the grain boundaries of a base metal.

**intermediate flux.** A soldering flux with a residue that generally does not attack the base metal. The original composition may be corrosive.

**intermediate weld bead.** A weld bead resulting from an intermediate weld pass.

**intermediate weld pass.** A single progression of welding along a joint subsequent to the root pass(es) and prior to the cover pass(es).

**intermittent weld.** A weld in which continuity is interrupted by recurring unwelded spaces. See Figures 23(G)–(I).

lack of penetration. A nonstandard term for **incomplete joint penetration.**

**lamellar tear.** A subsurface terrace and step-like crack in the base metal with a basic orientation parallel to the wrought surface caused by tensile stresses in the through-thickness direction of the base metals weakened by the presence of small dispersed, planar shaped, nonmetallic inclusions parallel to the metal surface. See Figure 33(B).

**lamination.** A type of discontinuity with separation or weakness generally aligned parallel to the worked surface of a metal.

**lance.** See **oxygen lance** and **oxygen lance cutting.**

land. A nonstandard term for **root face.**

**lap joint.** A joint between two overlapping members in parallel planes. See Figures 1(D), 2(D), 3, 4(D), 11(D), 14(A), 14 (C)–(H), 15 (D)–(F), and 51(C).

**laser.** A device that produces a concentrated coherent light beam by stimulated electronic or molecular transitions to lower energy levels. Laser is an acronym for light amplification by stimulated emission of radiation.

**laser beam air cutting (LBC-A).** A laser beam cutting process variation that melts the workpiece and uses an air jet to remove molten and vaporized material.

**laser beam braze welding (LBBW).** A braze welding process variation that uses a laser beam as the heat source.

**laser beam cutting (LBC).** A thermal cutting process that severs metal by locally melting or vaporizing with the heat from a laser beam. The process is used with or without assist gas to aid the removal of molten and vaporized material. See also **laser beam air cutting, laser beam evaporative cutting, laser beam inert gas cutting,** and **laser beam oxygen cutting.**

**laser beam cutting operator.** See **thermal cutting operator.**

**laser beam diameter.** The diameter of a laser beam circular cross section at a specified location along the laser beam axis.

**laser beam evaporative cutting (LBC-EV).** A laser beam cutting process variation that vaporizes the workpiece, with or without an assist gas, typically inert gas, to aid the removal of vaporized material.

**laser beam expander.** A combination of optical elements that will increase the diameter of a laser beam.

**laser beam inert gas cutting (LBC-IG).** A laser beam cutting process variation that melts the workpiece and uses an inert assist gas to remove molten and vaporized material.

**laser beam oxygen cutting (LBC-O).** A laser beam cutting process variation that uses the heat from the chemical reaction between oxygen and the base metal at elevated temperatures. The necessary temperature is maintained with a laser beam.

**laser beam splitter.** An optical device that uses controlled reflection to produce two beams from a single incident beam.

**laser beam welding (LBW).** A welding process that produces coalescence with the heat from a laser beam impinging on the joint.

**lasing gas.** A gaseous lasing medium.

**lasing medium.** A material that emits coherent radiation by virtue of stimulated electronic or molecular transitions to lower energy.

**layer.** A stratum of weld metal consisting of one or more weld beads. See Figures 23(D) and (E).

layer level wound. A nonstandard term for **level wound.**

layer wound. A nonstandard term for **level wound.**

lead angle. A nonstandard term for **travel angle.**

lead burning. A nonstandard term when used for the welding of lead.

**leg of a fillet weld.** See **fillet weld leg.**

**lens.** See **filter lens.**

**level wound.** Spooled or coiled filler metal that has been wound in distinct layers such that adjacent turns touch. See also **random wound.**

**lightly coated electrode.** A filler metal electrode consisting of a metal wire with a light coating applied subsequent to the drawing operation, primarily for stabilizing the arc. See also **covered electrode.**

**linear discontinuity.** A discontinuity with a length that is substantially greater than its width.

**linear indication.** A test result in which a discontinuity in the material being tested is displayed as a linear or aligned array.

linear porosity. A nonstandard term when used for **aligned porosity.**

**liquation.** The partial melting of compositional heterogeneities such as banding or inclusion stringers in heated base metal or heat-affected zones.

**liquidus.** The lowest temperature at which a metal or an alloy is completely liquid.

**plenum chamber.** The space between the electrode and the inside wall of the constricting nozzle of the plasma arc torch or thermal spraying gun. See Figure 35.

**plug weld.** A weld made in a circular hole in one member of a joint fusing that member to another member. A fillet-welded hole is not to be construed as conforming to this definition. See Figure 15(E).

**plug weld size.** The diameter of the weld metal in the plane of the faying surfaces.

poke welding. A nonstandard term for **push welding.**

**polarity.** See **direct current electrode negative** and **direct current electrode positive**

**porosity.** Cavity-type discontinuities formed by gas entrapment during solidification or in a thermal spray deposit.

**position.** See **welding position.**

**positional usability.** A measure of the relative ease of application of a welding filler metal to make a sound weld in a given welding position and progression.

**position of welding.** See **welding position.**

**postflow time.** The time interval from current shut off to either shielding gas or cooling water shut off. See Figures 52 and 53.

**postheating.** The application of heat to an assembly after brazing, soldering, thermal spraying, thermal cutting, or welding.

**postweld interval,** *resistance welding.* The total elapsed time from the end of the weld interval to the end of hold time. See Figure 49.

powder alloy. A nonstandard term for **alloy powder.**

**powder blend.** A mixture of two or more alloy, metal, or nonmetal powders. See also **alloy powder.**

**powder composite.** Two or more different materials combined to form a single particle, formed by either chemical coating or mechanical agglomeration.

powder cutting. A nonstandard term for **flux cutting** and **metal powder cutting.**

**powder feeder.** A device for supplying powdered material for thermal cutting, thermal spraying or welding.

powder feed gas. A nonstandard term for **carrier gas.**

**powder feed rate.** The quantity of powder fed to a thermal spraying gun or a cutting torch per unit of time.

**powder flame spraying.** A flame spraying process variation in which the surfacing material is in powder form. See also **flame spraying.**

**power source.** An apparatus for supplying current and voltage suitable for welding, thermal cutting, or thermal spraying.

power supply. A nonstandard term when used for **power source.**

**precoating.** Coating the base metal in the joint by dipping, electroplating, or other applicable means prior to soldering or brazing.

**preflow time.** The time interval between start of shielding gas flow and arc starting. See Figures 52 and 53.

**preform.** Brazing or soldering filler metal fabricated in a shape or form for a specific application.

**preheat.** The heat applied to the base metal or substrate to attain and maintain preheat temperature.

**preheat current,** *resistance welding.* An impulse or series of impulses that occur prior to and are separated from the welding current. See Figure 49.

**preheat temperature,** *brazing and soldering.* The temperature of the base metal in the volume surrounding the point of brazing or soldering immediately before brazing or soldering is started.

**preheat temperature,** *thermal cutting.* The temperature of the base metal in the volume surrounding the point of thermal cutting immediately before thermal cutting is started.

**preheat temperature,** *thermal spraying.* The temperature of the substrate in the volume surrounding the point of thermal spraying immediately before thermal spraying is started. In a multipass thermal spraying, it is also the temperature immediately before the second and subsequent passes are started.

**preheat temperature,** *welding.* The temperature of the base metal in the volume surrounding the point of welding immediately before welding is started. In a multipass weld, it is also the temperature immediately before the second and subsequent passes are started.

**preheat time,** *resistance welding.* The duration of preheat current flow during the preweld interval. See Figure 49.

**prequalified welding procedure specification** (PWPS). A welding procedure specification that complies with the stipulated conditions of a particular welding code or specification and is therefore acceptable for use under that code or specification without a requirement for qualification testing.

**pressure-controlled resistance welding (RW-PC).** A resistance welding process variation in which a number of spot or projection welds are made with several electrodes functioning progressively under the control of a pressure-sequencing device.

also **groove and rotary roughening, knurling,** and **threading and knurling.**

**rotational spray transfer,** *gas metal arc welding.* A variation of spray transfer in which a longer electrode extension and specialized gas mixtures are used to produce a helical pattern of very fine droplets.

**rough threading,** *thermal spraying.* A method of surface roughening that consists of cutting threads with the sides and tops of the threads jagged and torn.

**round edge shape.** A type of edge shape in which the surface is curved. See Figure 7(G).

**runoff weld tab.** Additional material that extends beyond the end of the joint, on which the weld is terminated. See also **starting weld tab.**

## S

**salt-bath dip brazing.** A dip brazing process variation.

**scarf.** A nonstandard term for **bevel.**

**scarf groove.** A weld groove formed by the combination of butting members having single-bevel edge shapes arranged with parallel groove faces. See Figure 13(B).

**scarf joint.** A nonstandard term for **scarf groove.**

**seal-bonding material,** *thermal spraying.* A material that partially forms, in the as-sprayed condition, a metallic bond with the substrate.

**seal coat,** *thermal spraying.* Material applied to infiltrate and close the pores of a thermal spray deposit.

**seal weld.** Any weld intended primarily to provide a specific degree of tightness against leakage.

**seam.** A nonstandard term when used for a brazed, soldered or welded, joint.

**seam weld.** A continuous weld made between or upon overlapping members, in which coalescence may start and occur on the faying surfaces, or may have proceeded from the outer surface of one member. The continuous weld may consist of a single weld bead or a series of overlapping spot welds. See Figures 14 and 51(C). See also **arc seam weld** and **resistance seam welding.**

**seam weld size.** The width of the weld metal in the plane of the faying surfaces. See Figures 25(F) and 25(G).

**secondary circuit.** That portion of a welding machine that conducts the secondary current between the secondary terminals of the welding transformer and the electrodes, or electrode and workpiece.

**secondary current path,** *resistance welding.* The electrical path through which the welding current passes.

**selective block sequence.** A block sequence in which successive blocks are completed in an order selected to control residual stresses and distortion. See also **progressive block sequence.**

**self-fluxing alloy,** *thermal spraying.* A surfacing material that wets the substrate and coalesces when heated to its melting point, with no flux other than the boron and silicon contained in the alloy.

**self-shielded flux cored arc welding (FCAW-S).** A flux cored arc welding process variation in which shielding gas is obtained exclusively from the flux within the electrode.

**semiautomatic,** *adj.* pertaining to the manual control of a process with equipment that automatically controls one or more of the process conditions. See also **adaptive control, automatic, manual, mechanized,** and **robotic.**

**semiautomatic brazing.** See **semiautomatic welding.**

**semiautomatic soldering.** See **semiautomatic welding.**

**semiautomatic thermal cutting.** See **semiautomatic welding.**

**semiautomatic thermal spraying.** See **semiautomatic welding.**

**semiautomatic welding.** Manual welding with equipment that automatically controls one or more of the welding conditions. See Table 4. Variations of this term are **semiautomatic brazing, semiautomatic soldering, semiautomatic thermal cutting,** and **semiautomatic thermal spraying.** See also **adaptive control welding, automatic welding, manual welding, mechanized welding,** and **robotic welding.**

**semiblind joint.** A joint in which one extremity of the joint is not visible.

**sequence time.** A nonstandard term when used for **welding cycle.**

**series submerged arc welding (SAW-S).** A submerged arc welding process variation in which the arc is established between two consumable electrodes that meet just above the surface of the workpieces, which are not part of the welding current circuit.

**series welding.** A resistance welding secondary circuit variation in which the secondary current is conducted through the workpieces and electrodes or wheels in a series electrical path to simultaneously form multiple resistance spot, seam, or projection welds. See Figures 46(C) and 46(D). See also **parallel welding.**

**virgin flux,** *submerged arc welding.* Unused flux that has been produced using new raw materials. See also **recycled flux.**

**voltage regulator.** An automatic electrical control device for maintaining a constant voltage supply to the primary of a welding transformer.

## W

wash pass. A nonstandard term when used for a **cosmetic weld pass, cover pass,** or **smoothing pass.**

**waster plate,** *oxyfuel gas cutting.* A carbon steel plate placed on an alloy workpiece at the torch side to provide the necessary iron to facilitate cutting of the alloy workpiece.

**water wash.** The forcing of exhaust air and fumes from a spray booth through water so that the vented air is free of thermal sprayed particles or fumes.

**wave soldering (WS).** An automatic soldering process where workpieces are passed through a wave of molten solder. See also **dip soldering.**

**wax pattern,** *thermite welding.* Wax molded around the workpieces to the form desired for the completed weld.

**weave bead.** A weld bead formed using weaving. See Figure 22(B). See also **stringer bead.**

**weaving.** A welding technique in which the energy source is oscillated transversely as it progresses along the weld path. See also **weave bead** and **whipping.**

**weld.** A localized coalescence of metals or nonmetals produced either by heating the materials to the welding temperature, with or without the application of pressure, or by the application of pressure alone and with or without the use of filler material.

**weld,** *v.* The act of welding.

**weldability.** The capacity of material to be welded under the imposed fabrication conditions into a specific, suitably designed structure and to perform satisfactorily in the intended service.

**weld axis.** A line through the length of the weld, perpendicular to and at the geometric center of its cross section. See Figures 16(A), 16(B), and 21.

**weld bead.** A weld resulting from a weld pass. See Figures 22, 23(D), and 23(E). See also **stringer bead** and **weave bead.**

**weld bonding.** A resistance spot welding process variation in which the spot weld strength is augmented by adhesive at the faying surfaces.

**weld brazing.** A joining method that combines resistance welding with brazing.

**weld crack.** A crack located in the weld metal or heat-affected zone. See Figure 33.

**weld dam.** A metallic or nonmetallic object placed at the end of a weld groove to contain the molten metal and facilitate complete cross sectional filling of the weld groove. See also **runoff weld tab** and **starting weld tab.**

weld dam. A nonstandard term when used for **backing shoe.**

**welder.** One who performs manual or semiautomatic welding.

**welder certification.** Written verification that a welder has produced welds meeting a prescribed standard of welder performance.

**welder performance qualification.** The demonstration of a welder's or welding operator's ability to produce welds meeting prescribed standards.

**welder registration.** The act of registering a welder certification or a photostatic copy of the welder certification.

**weld face.** The exposed surface of a weld on the side from which welding was done. See Figures 24(A) and 24(E).

**weld face underfill.** See **underfill.** See Figures 32(E) and 32(F).

**weld gage.** A device designed for measuring the shape and size of welds.

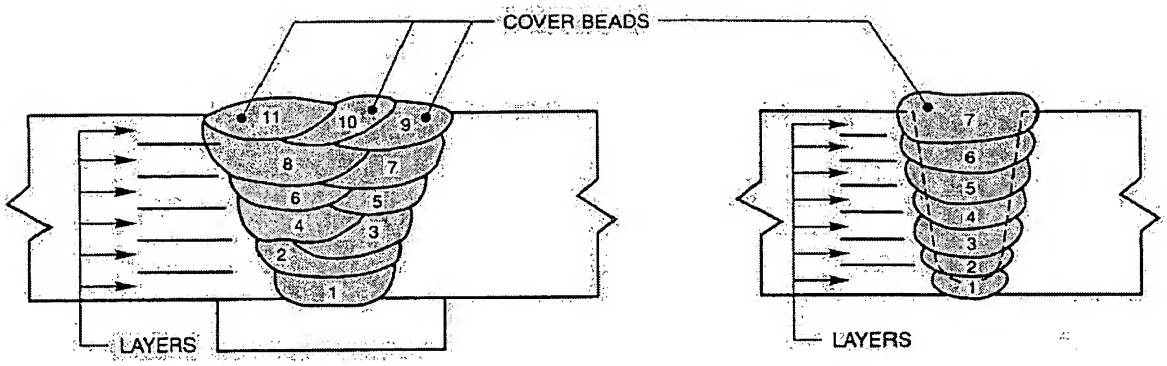
**weld groove,** *fusion welding.* A channel in the surface of a workpiece or an opening between two joint members that provides space to contain weld metal.

**welding.** A joining process that produces coalescence of materials by heating them to the welding temperature, with or without the application of pressure or by the application of pressure alone, and with or without the use of filler metal. See Figures 54(A) and 55–57.

**welding arc.** A controlled electrical discharge between the electrode and the workpiece that is formed and sustained by the establishment of a gaseous conductive medium, called an arc plasma.

welding blowpipe. A nonstandard term for **oxyfuel gas welding torch.**

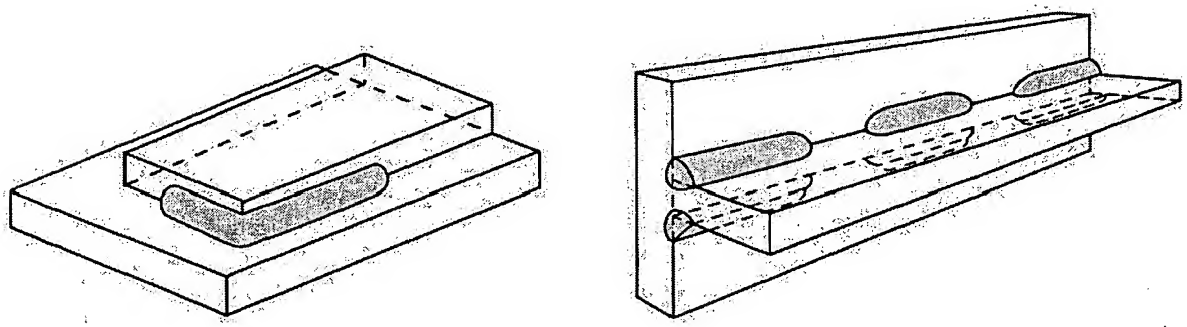
**welding current.** See **automatic arc welding current** and **resistance welding current.**




(D) CROSS-SECTIONAL SEQUENCE*

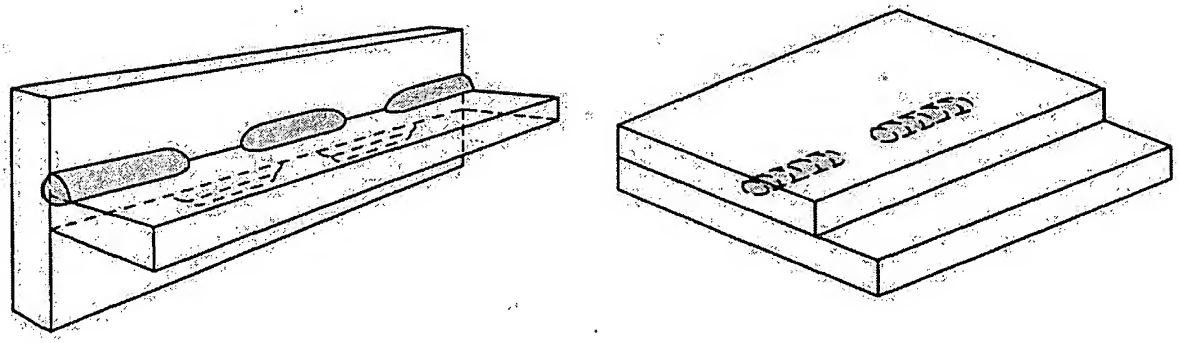
(E) CROSS-SECTIONAL SEQUENCE*

*Each weld bead is numbered sequentially.



(F) BOXING

(G) CHAIN INTERMITTENT FILLET WELD



(H) STAGGERED INTERMITTENT FILLET WELD

(I) INTERMITTENT SEAM WELD

**Figure 23 (Continued)—Welding Application Nomenclature**